The Province of Alberta

PETROLEUM AND NATURAL GAS CONSERVATION BOARD

IN THE MATTER OF THE GAS RESOURCES PRESERVATION ACT

AND IN THE MATTER of a Joint Hearing to determine various questions relating to the proposed Export of Natural Gas from the Province of Alberta.

I. N. McKinnon Esq., Chairman

D. P. Goodall Esq.

Dr. G. W. Govier

Session: October 31st, 1951.

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I N D E X

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W I T N E S S E S

E X H I B I T S

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THE CHAIRMAN: Before I ask Mr. McDonald to proceed, it has become very evident to the Board that most of the applicants are not prepared to carry on with their submissions, and we are judging that on the basis of the submissions that we have received to date. We are very reluctant to do this, but we are prepared to consider an adjournment to November 13th, and we would like to get the views of counsel in regard to that.

MR. McDONALD: Mr. Chairman, I feel, sir, that we have done our best to present our case, which is Number 1 on the list. It is true, sir, that I have been delinquent in one or two matters, but I feel that we are prepared to proceed and that we can, at least during the balance of this week, or the start of next week, get the evidence-in-chief of all the other applicants. Surely their submissions will be ready by Monday, and then we might deal with the matter of cross-examination. I feel that delaying it another week will just involve a great deal of expense for all the applicants, and would put a burden on the Board in carrying the Hearings into December, which, I am sure, we all wish to avoid.

MR. S. B. SMITH: Well, we reluctantly concur in the adjournment, but we are ready to proceed with what we have, and I am prepared to distribute what we have prepared.

MR.NOLAN: As far as our company is concerned, Mr. Chairman, we have been having reproduction trouble. My suggestion would be that we go on and complete the week,

complete the work for this week and then take stock on Thursday afternoon and see where we are rather than adjourn now to a definite date.

MR. MARTLAND: We would appreciate an adjournment until that time, sir.

MR. STEER: I think it is a matter of indifference to me, sir.

MR. MACLEOD: We hope to be ready by the first of the week, but it would be a convenience to adjourn.

MR. C. E. SMITH: I hope nobody has the idea that your suggestion, Mr. Chairman, was for the convenience of the Board. Some of them seem to think that the Board is asking for an adjournment. Surely, all that was being suggested was that all applicants would have one last opportunity of getting their material together and getting it before the Board at least a day or two, even if we reduce the week to a day or two, a day or two before the witness is heard. I would suggest if the adjournment is made that counsel had better again consider whether it should not be made as of today rather than Thursday, because if we are going to start and put a piece of this in, and put a piece of that in, by Thursday we are going to have a peculiar record. I wondered if any one of them thought of that situation? In other words, there might be in the record a piece of evidence for Westcoast, a piece of Prairie, a piece of Northwest, or something else, and it would be a little difficult to follow. However, it does not matter to me, if they think something can be accomplished in the next two days. If they do, it is all right with me.

MR. McDONALD: Sir, the position I would like to take,

if there is an adjournment to be made, that we complete the submissions filed.

THE CHAIRMAN: Well, I think that is quite right, Mr. McDonald, but have your submissions been given to the other parties in time for them to cross-examine, or to study them and cross-examine on them?

MR. McDONALD: I do not know, sir, it depends on their ability to absorb them.

THE CHAIRMAN: They could stay up all night and study them. However, we are quite prepared to sit today and tomorrow, and we will sit next week, but it would seem to us that there will be a lot of time wasted because the submissions are not ready and counsel would not have sufficient time to study them, and that will mean that the record will become all mixed up.

MR. STEER: I would venture to suggest, sir, that Mr.Smith's suggestion is sound, that if there is to be an adjournment it be now, and that everything be completed at the resumed hearing. I said it was a matter of indifference to me. I have, or shall have a submission to make on behalf of the distributing companies, but I am afraid it is not ready but will be within the next day or two.

MR. C. E. SMITH: My suggestion, sir, was purely for the consideration of counsel. It does not matter to me, but I thought it might suit them better if it was brought to their attention.

THE CHAIRMAN: Mr. McDonald, I know that you have brought Dr. Hetherington here today, and we are quite prepared to hear Dr. Hetherington, and if anyone wants to cross-examine him they can.

MR. McDONALD: Could I have this information, sir? Are the counsel prepared to finish cross-examination of Mr. Poor and Mr. Sample today and tomorrow?

THE CHAIRMAN: Well, I think that that is very fair. They have had sufficient time to study their submissions.

MR. McDONALD: I just hesitate to bring these three gentlemen back again two weeks from today, or two weeks from now, because they are brought at very great expense.

THE CHAIRMAN: Mr. McDonald, we will proceed to hear the case of your company as far as you want to go, provided the submission has been in the hands of counsel for a sufficient time to enable them to cross-examine.

MR. McDONALD: I would like to have an opportunity, sir, to discuss it, if we can have a ten-minute adjournment.

THE CHAIRMAN: Yes.

MR. McDONALD: Thank you.

(Hearing resumed after short adjournment)

(Go to page 1542)

MR. McDONALD: May it please the Board, sir, I would like to continue today with the cross-examination of Mr. Sample and Mr. Poor on the exhibits that they filed, then Dr. Hetherington can proceed with the deliverability submission which has been distributed. And then, sir, I would like Mr. Poor to put in evidence the route and construction costs of what we term the Inland Empire Line, and that will be evidence adduced now.

THE CHAIRMAN: That will be agreeable to the Board. In that case, after hearing this evidence of Mr. McDonald's we will adjourn then until November 13th.

MR. McDONALD: Yes, sir. I would also suggest, sir, if necessary, we work into this afternoon so that we can disperse tonight.

THE CHAIRMAN: We can do that or sit tomorrow.

MR. McDONALD: I would like to call Mr. Sample.

COLEMAN R. SAMPLE, recalled, already sworn, examined by Mr. McDonald, testified as follows:

Q You will recall, sir, that on Monday the request was made that we give some consideration to the market for proposed sales lateral from the main gathering line south to Grande Prairie. We prepared a very brief submission on that, sir, which could be submitted now.

ESTIMATE OF MARKET FOR PROPOSED SALES LATERAL FROM MAIN GATHERING SYSTEM TO GRANDE PRAIRIE, ALBERTA, PUT IN AND MARKED EXHIBIT 48.

Q It is very short, Mr. Sample, and I believe if you would read it into the record it would be the best way.

A WESTCOAST TRANSMISSION COMPANY LIMITED

Sales Lateral to Grande Prairie, Alberta

The population to be served in the various communities along the above sales lateral, according to "Alberta Facts and Figures" for the 1946 census is as follows:

Spirit River,	362
Rycroft,	272
Sexsmith,	302
Clairmont	102
Grande Prairie,	2,267 x
	3,305

x(Note: "In Town of Grande Prairie - Economic Survey", published in 1949 by the Department of Economic Affairs of Alberta, estimates 1949 population at 3,700, which would change the total figure for the population to be served by the Sales lateral to 4,738.) 1950 population figures of these communities probably exceed 5,000.

Other communities along the line for which no population figures are available are:

Esther

Woking

Braeburn

Webster

Farms and other fuel users adjacent to the lateral would, of course, also be served. In addition

it is possible that the villages of Wembley (population - 237) and Beaverlodge (population - 443) may be served if economically feasible.

The major industrial load that can be serviced by such line is the electric generating plant of Canadian Utilities Ltd., at Grande Prairie. This plant is presently operating 6 diesel units, with a total capacity of 2,350 HP; 1,380 Kw. It services Grande Prairie, Sexsmith, Wembley, Beaverlodge, Hythe, various hamlets and some 100 individual farms, and in 1949 supplied 3,652,000 Kw. hours. In the town of Dawson Creek, B.C., the advent of natural gas caused the conversion of the diesel electric plant there to natural gas. It would appear that it would be advantageous to Canadian Utilities Ltd., to convert the Grande Prairie station. If so converted the plant would use on the basis of 1948 production approximately 52,000,000 cubic feet of gas.

It should also be stated that subsequent discoveries in the Peace River area will involve additional gathering lines. Any other communities adjacent to such lines will be served where economically feasible.

Having in mind the Company's experience to date in serving the Town of Dawson Creek, B.C., the market for natural gas on the Grande Prairie line should be in the range of 350 - 400,000 Mcf. per year.

THE CHAIRMAN: Does anyone wish to question Mr. Sample?

Q DR. GOVIER: Mr. Sample, does this include the total market within the Province of Alberta

that would be served by this part of the gathering system, or by the entire gathering system, I should say?

A That is just the market to be served by this lateral shown on the map by running down to Grande Prairie. That is on the gathering system diagram following page 44 in Exhibit 44.

Q Would there by any significant market served from the main line of the gathering system?

A Well, as pointed out, there will be perhaps small communities which can be reached, but so far as our studies go they are all very small communities and hardly large enough to warrant a market study at the moment.

Q For practical purposes, I suppose the Board can assume the Alberta market to be served by this gathering system will be in the order of 350 to 400 million per year, is that right?

A Yes. You might say that would be the market in the first year or two as we see this system as laid out in this map. As new wells and fields are brought in, of course, that could be extended.

Q MR. C.E. SMITH: Having regard to the mileage, size of pipe and so on, probably you are not the right person to ask this of, but is it in your opinion economical, to use a layman's term, to build such a line for such a market? Do you think the company would ever build it having regard to population?

A I personally have not made any economic studies but Grande Prairie is a city now in the neighbourhood of approaching 5,000 population. I think it is entirely likely in that area that a line could be built.

Q You think that line could be built?

A Yes.

Q Having regard to the information you have given us with regard to markets and probable amount of gas to be delivered, is that right?

A That is right.

Q Is that a fair way to put it?

A Yes. It is only 47 miles, Mr. Smith.

Q That seems to be quite a long way.

A 6-5/8 pipe.

Q Well, that is your best opinion, that that could be done, having regard to the figures you have given?

A That is right.

Q That is all.

THE CHAIRMAN: Proceed to your Exhibit 44 now.

MR. McDONALD: I think, sir, I will call Mr. Poor for cross-examination on Exhibit 44, and then call Dr. Hetherington.

MR. NOLAN: I wonder if I might be permitted to ask Mr. Sample a question.

Q On page 44, the part you put forward on page 9 particularly, at the top where you are discussing the fluctuation in the prices of Bunker C grade fuel oil. Have you that before you, Mr. Sample?

A Yes, sir.

Q I will just read to you what you say.

"To illustrate, in Seattle, Wash., Bunker C fuel oil price is approximately $2.50 per barrel in

"1948 and declined to $1.50 and $1.60 per barrel in the early part of 1950. During 1950 and in 1951 there have been several increases to a recent level of about $2.50."

That statement was put in to show the fluctuation in the prices from time to time. What I wanted you to tell me was, is it a fact that the price of this Bunker C grade fuel oil is $2.50 today in Seattle, Washington?

A According to recent information, the quotation -- some of the large users are getting it at a lower price.

Q How much lower?

A A lot of that is confidential. I do not know but I suspect, from information I have, that some of the larger users might be buying it around $2.10 or $2.20.

Q So there is a spread between $2.10 and $2.20 and $2.50, according to the amount that is being taken?

A Yes, there is always a spread. When we are talking about Bunker C grade, there is some flexibility there, different qualities of oil. I brought this out because in the market presentation of January 1950 the question came up about the depressed price of heavy fuel oil at that time. Though I say the price is $1.50 to $1.60 a barrel, there were instances of oil being bought cheaper than that.

Q For the same reasons you have given me?

A It was more or less a temporary depressed price.

Q I think from what you just said, Mr. Sample, the Bunker C grade is not a grade, there are gradations in that grade, are there?

A Yes. Bunker C is a commercial term for heavy oil that

corresponds to No. 6 at the Pacific Coast and then there are designations, 300, 400 series. It is a little heavier than a P.S.400 oil.

Q Are there any names given to the various grades within the grade? It is just a different quality of that grade?

A Usually different quality, yes.

Q And a different price?

A The prices vary with the gravity and the quality of the oil and so forth.

Q I see. All right, thank you.

MR. MARTLAND: I have a few questions with regard to Exhibit 44, if I may.

Q Mr. Sample, if you would not mind turning first of all to page 7 of your Exhibit 44, to the second paragraph there. There is a statement that,

> "For the cities of Vancouver, Everett, Tacoma, Olympia and Centralia-Chehalis sales have been estimated at a higher volume than company's estimates to provide for an almost certain demand for greater sales for space heating."

I take it that means that your estimates are higher than the estimates made, for example, by B.C. Electric as to the Vancouver area?

A That is correct.

Q In what respect do you feel that these estimates made by the companies on the ground are deficient? In what respect have they fallen down?

A Well, I am satisfied from my studies and experience that the estimates of the British Columbia Electric Company

and the Washington Gas and Electric Company with respect to the market for natural gas for space heating are wholly understated.

Q Were they made on some different basis from those estimates that were made by the Seattle Gas Company?

A I think it is largely a matter of viewpoint and what the company thinks they might do.

Q Again, it is another instance of exercise of judgment, is it, Mr. Sample?

A In the case of Vancouver, it is not only a matter of judgment but particularly in Vancouver the British Columbia Electric serves a relatively small area with the present distribution system of Vancouver, and particularly metropolitan Vancouver. When natural gas is brought in there within a 5-year period I am convinced there is going to be a much bigger market for space heating because of the high fuel cost.

Q Can you tell us approximately how much less their estimates are than yours, say, in the 5th year of the total?

A In the case of Vancouver the company estimated total sales in the 5th year of 7,791,000 Mcf., and that was broken down. I won't read all the figures but just to illustrate, out of that was 2,060,000 for domestic space heating, only 255,000 Mcf. for commercial space heating. Those were all taken from their exhibit, of course. In my revised estimate, I have added 1½ million Mcf. in the 5th year for domestic space heating and 400,000 Mcf. for commercial space heating to the B.C. Electric Company's estimate.

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Q I see. Now, if you would not mind turning to the next page, page 8, where you have a comparison of costs of various fuels. I wonder if you could tell me the grade of the domestic fuel oil which was used in preparing your submission, Mr. Sample?

A Well, this table on page 8 to which you refer, of course, is a condensation of more detailed information that appeared in my Exhibit 39 of the first Hearing in which I gave several pages of detailed competitive fuel prices. Here I have attempted to bring together into the domestic fuel oil the grades most usual, stove oil and what you call a No. 200, or No. 2 oil, and illustrate averages and ranges rather than get into specific prices for specific grades.

Q When you were making your current estimate, did you fix on any particular price of fuel oil within the range which is shown there? For example, there is a range of 90 cents to $1.00 for Vancouver, and a bigger range for the American area.

A No, these were simply just to show the high cost of fuel oil in relation to each other, that is, oil, coal, and so forth, and the costs per Btu. or Mcf. are all higher than you would ever expect to sell natural gas for.

Q When you made your estimate as to natural gas sales, it was not with relation to any specific price of fuel oil within the range?

A No, not in the range.

Q Page 11, Mr. Sample. I wonder if you could tell us how many domestic customers are involved with respect to your column headed "Saturation". Have you those figures?

A I do not have them readily available. Of course, in the case of Seattle and Portland, there are available exhibits. I would have to work them up. I mean, I do not have them at my finger-tips this morning.

Q They could be obtained?

A Yes, they could be obtained.

Q And can you tell me how the average use per customer Mcf. there, how that was computed? What did you take into account in making your estimate in each of these centers?

A Well, those all refer to the 5th year of operation and it is the total estimated consumption by domestic consumers in each of those localities in the 5th year divided by the number of consumers.

Q Well, is it just a judgment figure?

A That is the resulting figure of the estimates, of the estimated number of customers.

Q Now, page 12, Mr. Sample, there are some figures given as to sales per residential consumer in the United States, and one that stands out as the largest is North Dakota. In fact, there are only a couple of small towns that distribute natural gas in North Dakota, Mr. Sample?

A That is true. All I intended here was to illustrate the range of consumption per domestic consumer as affected by States in which there was a lot of natural gas, coal requirements, and so forth.

Q Are Bismarck and Lewiston in North Dakota?

A I do not know just offhand what two cities are using natural gas.

Q And then page 14, in the last paragraph, you have an

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estimate of sales of industrial gas in the 5th year shown on the table amounting to 32,739,700. How is that figure determined, Mr. Sample? Is it by taking a percentage of the potential as shown on the top of this same page?

A In the case of Bellingham, Seattle and Portland, it is the company estimates now as re-produced herein. The other instances it is based as a result of our survey and what we figured a conservative percentage to the estimated fuel oil in the various classifications.

(Go to page 1553)

Q In the case of Vancouver, it would be the B.C.Electric figure plus your judgment as to a larger amount?

A As I recall it, the industrial load for Vancouver is essentially the British Columbia Electric, the company's own estimate, which happened to coincide very closely with our own estimate as shown in Exhibit 39.

Q Closely to your own estimate?

A Yes.

Q Now, at page 15, the second paragraph, you have an estimate there as to the rates of increase during each of the first five years?

A Yes, sir.

Q Did you make any separate computation with regard to the different classes of consumer, or is that just a bulk figure?

A That is a bulk figure, in the sense that it is a figure for the community outside of the company's figures where we had to make an independent estimate.

Q Yes? I had wondered if you had made any separate estimate with regard to the rate of increase in domestic, commercial and industrial, whether the computation was made?

A It might have been made two years ago. I do not remember it, but in this particular instance, having made it and established the over-all percentage, it was not done.

Q Was there any determination on the amount which would be consumed on peak days during the first four years as distinct from the fifth year, which is shown in detail?

A Yes, we estimated the maximum day or peak load for each of the five years.

Q Is that information available?

A It is not in this exhibit.

Q No. I mean, can you give it to us readily?

A What is that?

Q Could you give it to me quite readily?

A I have just the working paper here, if you would like to use it, I have copies of it. Do you want the figures?

Q Yes?

A I will give them to you. The maximum day with peak shaving in the first year, it would be 100,108. These are all figures in Mcfs.

Q Yes?

A And in the second year, 140,376; third year, 187,754; fourth year, 202,004; the fifth year is 228,312, which figure appears on page 18 of Exhibit 54.

MR. McDONALD: I might point out, Mr. Chairman, that the peak day by delivery points is on page 37 of the exhibit.

Q MR. MARTLAND: Now, with regard to your industrial, and taking the interruptible, can you tell me how many interruptible customers are involved, Mr. Sample?

A No, I cannot.

Q Is that information available?

A Not as to the number of customers, because as was brought out a moment ago, we have this very large industrial load which we have analyzed from the standpoint of potential users of gas, and have not reached the point where we can say that company XYZ, or company A, company B, and so forth, is going to use the gas and come in in any particular year.

Q Now,in making these estimates as to the potential market, Mr. Sample, there does not appear to be any indication as to the price at which it will be sold. Can you tell me what prices were taken into account in making these estimates, that is, as to the town border and the retail price to the various consumers?

A Well, I think that is a question that was asked me before, and I will have to answer it in the same way. We did not have any knowledge at the time that we made the market survey as to what the gas would cost at these borders, but we know that the price of gas being delivered at the borders, will be low enough to be competitive with other fuel prices, and that will give us a leeway to make adjustments.

Q You say it would be low enough to compete, so that you must have had some figure in mind. Can you tell me what that would be?

A Well, frankly, there has been so much talk about the price of gas that I do not have in mind any particular price, but it would be in the range of 30 or 35 cents two years ago.

Q Is that at the town gate?

A Yes, something on that order.

Q Yes?

A We had not any knowledge at the time what the price of gas would be at the well.

Q What about the price to the different classes of consumers? Did you have some range in mind there?

A No, I did not, in the sense that I would not want to refer to any price which would be representative of the spread

between city gate prices and what the utility companies would want to charge their customers for various classes of natural gas. Now, that information is available for other communities, but every community is different. In the case of your industrial gas you have always a chance to sell gas, perhaps, at below the gate price at a demand commodity rate, so that there is a lot of flexibility.

Q The estimate was made,then, on the general assumption of being able to say that you will have a price which is competitive with other fuels?

A That is right.

Q All right, thank you.

.....

CROSS-EXAMINATION BY MR. S. B. SMITH:

Q Mr.Sample, you said to Mr. Martland, that you had a price of 30 to 35 cents at the town gate in mind, just a moment ago?

A I said I was probably thinking in that range.

Q What load factor did you have in mind in giving that figure?

A The load is determined after you make the market survey.

Q I beg your pardon?

A The load factor is determined after you make out your market survey. We recognize the potentials for selling interruptible gas, that you could maintain some reasonable load factor, just as we have other places.

Q A reasonable load factor?

A Yes.

Q So that in relation to the 30 or 35 cents you have not any load factor in mind at all, have you, Mr.Sample?

A You are asking me what I had in mind two years ago. I do not recall that I had any load factor in mind.

Q So that you do not know today?

A Well, as I pointed out in my exhibit 39, we had a load factor of around 65%, as I recall. I always realized that you could do better than that.

Q Was that related to the 30 or 35 cents at all?

A No, not necessarily.

Q No?

A It would have a bearing on it.

Q Now, you gave to Mr. Martland figures as to your peak day or maximum day for the first, second, third, and fourth years, which you had not previously given, as I recall it. Have you made an economic cost study in relation to the first year of operation of the pipe line that you are describing here?

A I have not. The studies have been made in our office, yes.

Q The study in relation to the first year of operation of the pipe line?

A Yes.

Q Are you prepared to answer on that subject, or is someone else?

A I am not prepared to answer any questions, no.

Q You do not know?

A No.

Q You do not know the service cost per thousand feet of gas in your system in the first year?

A I am sorry, I did not understand your question.

Q You cannot tell us what the service cost per thousand cubic feet of gas in the first year would be in the operation of your system?

A Just offhand, I do not know.

Q You do not know, Mr. Sample?

MR. McDONALD: I might point out, Mr. Chairman, that the Board has directed that an exhibit be filed in connection with that point, and it will be filed in due course.

MR. S. B. SMITH: I was just trying to find out if Mr. Sample was going to deal with it, Mr. McDonald.

MR. McDONALD: Somebody is going to deal with it.

MR. S. B. SMITH: Somebody else is going to deal with this?

MR. McDONALD: Certainly.

MR. S. B. SMITH: Who will be dealing with that subject?

MR. McDONALD: Whatever witness I call.

MR. S. B. SMITH: I see.

Q You are not prepared to tell me at the moment, Mr.Sample?

A No.

.....

RE-EXAMINATION BY MR. McDONALD:

Q There is only one point that I might deal with now. If you will turn to page 8 of your exhibit, Mr. Sample?

A Yes.

Q You show there that the fuel costs per million BTUs in the late fall of 1949, you show for fuel oil, domestic, a cost of 90 cents to $1.00, isn't that right, Mr. Sample?

A That is the Vancouver area.

Q Yes. Now, if a man in Vancouver got his gas for 89 cents

or 99 cents, he would be getting a bargain, wouldn't he?

A Yes, because our prices are directly competitive and comparative on a BTU basis.

Q So that it is not necessary to sell that gas for less than 89 to 99 cents, and still be below your competitive price?

A Yes.

Q That is, using oil?

A Yes.

Q And similarly for coal?

A Yes, that is right.

Q Thank you.

Q THE CHAIRMAN: When you were giving the average consumption per consumer for the various parts of the States, can you tell us the number of people or consumers that would be supplied on that basis?

A Well . . .

Q I presume the consumer would be the number of families using gas, and is that related to any particular number per family or consumer?

A You are referring now to page 11?

Q Page 12?

A Page 12?

Q Yes?

A That w s prepared by taking the total sales for domestic use divided by the total number of residential consumers, which normally would be families, and this is the resulting use in Mcf per customer.

Q There is no standard figure that you would use, so many people on a per capita basis?

A No, this Table was prepared from statistics put out by

The Natural Gas Association. They have quite a statistical section on gas sales. In one section they will show the number of consumers by classes, another section will show the sales in Mcfs by the same classes, and again you have it divided between natural gas, manufactured gas, and other.

Q On a strictly consumer basis?

A That is right.

THE CHAIRMAN: Do you wish to put Mr. Poor on the stand now, Mr. McDonald?

MR. McDONALD: Yes, sir.

.....

WILLIAM B. POOR, recalled, already sworn, testified as follows:-

MR. McDONALD: Mr. Poor is ready for cross-examination, sir, on Exhibit 44.

CROSS-EXAMINATION BY MR. NOLAN:

Q There are just a few things I would like to ask Mr. Poor, Mr. Chairman, and it will help me to understand some of these statements. Mr. Poor, would you be good enough to look at the summary of the estimated transmission system construction costs on the main line system in Canada, at page 48 of Exhibit 44, the fourth item there.

A Yes.

Q That is freight on pipe, and the total in respect to the main line and branch lines, $2,398,900.00?

A Yes.

Q What rate did you use in estimating the freight on the pipe?

A You are speaking about item 4?

Q 4, yes?

A I will have to refer to the details that are set forth in there.

Q Where does the pipe come from?

A May I answer your first question first, please?

Q What page should I look at?

A I believe on page 51.

Q 51?

A Yes.

Yes?

A The freight on the main line pipe in Canada was figured at slightly in excess of $20.00 per ton. That price, as I recall, would be competitive with the freight rates on pipe from the Eastern mills.

Q Where is the pipe coming from upon which this freight is being paid, Mr. Poor?

A When you ask where the pipe is coming from, that is pretty hard to say. The present market for that character of pipe is either the West coast of the United States or Milwaukee, Wisconsin.

Q Well, it will make a difference in the amount of freight to be paid, will it not?

A Certainly, but that in turn has got to be weighed against the current price of pipe itself, there being presently a rather substantial differential between the pipe f.o.b. Milwaukee and the pipe f.o.b. California.

MR. McDONALD: Mr. Chairman, I do not want the witness to give unnecessary information or, I mean, the pipe is based on Vancouver, the freight is from Vancouver.

The price at Vancouver is based where it comes from, either the West coast or the Eastern mills.

Q MR.NOLAN: How do you get the pipe to Vancouver, Mr. Poor?

A If we take the pipe from Vancouver, it will be fabricated there.

Q You take the pipe from Vancouver?

A If it is taken from Vancouver, it will be fabricated at Vancouver.

Q Well, then, the steel had to be taken to Vancouver?

A Oh, yes, certainly.

Q Is there anything in here to represent the cost of your getting the steel to Vancouver, or is that involved in that?

A The price of pipe is f.o.b. Vancouver and would include that.

Q Includes the cost of that?

A Yes.

Q I was going to ask you also, if I could, under Item 6, Mr. Poor, "Installation of Pipe",on page 48, the page I was looking at before, there are just two or three things I wanted you to help me with, so that I could appreciate this statement.

(Go to page 1563)

Q The pipe is installed, I suppose, under contract, is it?

A Yes.

Q Is there included in this item No. 6 a contractor's profit?

A That depends how assiduously the contract is contrasted against the price as to whether he comes out with a profit or loss.

Q I see. That is his business?

A That is his business.

Q So that there is nothing in here that would represent in any way the profit of the contractor?

A There are very definitely prices in here that should include a reasonable profit to the man doing the work.

Q And what is a reasonable profit in the pipeline installation business?

A That calls for an opinion, but I would say currently that contractors that know their business are running a spread from 10 to, oh, 18 per cent profit.

Q Earlier in these proceedings, Mr. Poor, there was a great deal of discussion about access roads to these pipelines. You are familiar with access roads. Is there any provision made in your estimated construction costs for those roads, and if so, under what heading is that included?

A That is included in construction costs as set forth here, would be put in detail on the various classifications of the right-of-way step by step where appropriate access roads have been added.

Q Now, another thing I wanted to ask you about, there is a million dollars set aside for river and stream crossings. Are there any number of rivers to cross in this new route

of yours?

A I would not say there are a number. There are a number of small streams to cross. I believe the two largest rivers to be crossed throughout the whole route of the line prior to reaching Vancouver --

Q What did you say?

A I said "prior to reaching Vancouver".

Q You cross what?

A Two rivers.

Q The Fraser?

A The upper Fraser and the Thompson.

Q Those are the two main rivers, each of which is crossed once?

A That is correct.

Q How do you propose to cross those rivers?

A That is a detail that I would say would be worked out in the field after detailed design is under way. It would definitely be one of two methods, either an overhead crossing or a submerged crossing.

Q But that is something that is yet to be decided upon?

A That is correct.

Q In the compressor item, which is No. 15, compressor station, any contractor's profit is in the same situation as the contractor's profit for the installation of the pipe in item 6, which you explained?

A That is correct.

Q And in item No. 12, Mr. Poor, miscellaneous property, what is included in that?

A That is a catch-all for all the minor things that it was

not deemed necessary at this time to set forth. By way of example, if you are interested, it would be automotive equipment, furniture and fixtures, working equipment.

Q What we might call sundries, is it?

A Correct.

Q MR. C.E. SMITH: Does that include entertainment, Mr. Poor?

A That is an operating expense.

Q MR. NOLAN: Mr. Poor, in some of the estimates of costs which have been presented to the Board, there have been items relating to cathodic protection. Is that included in your estimate?

A That has not been included as such in here. It would be in miscellaneous property.

Q It would be in miscellaneous property. And I see that you have an item under 20, Interest During Construction, 4%. What does that mean, Mr. Poor? The money is borrowed to build the line and there is no revenue from the line and interest is paid on the borrowed money, is that what happens?

A That is correct, during the time the money is not earning or the property is not in service.

Q To put it another way, during the period of construction?

A That is correct.

Q How long will it be before the line in Canada is constructed?

A I have no idea.

Q Well, won't that make a difference in the amount of interest that has to be paid?

A No, I don't think so.

MR. McDONALD: Just pardon me, Mr. Nolan.

I think Mr. Nolan's question is, how long it would take to build the line. Isn't that what your question is?

MR. NOLAN: Yes.

A I understood he said "how long would it be before the line is built?" I would say it would be built over a 2-year period.

Q And that 4% figure of interest takes care of that 2-year period?

A That is correct.

Q I think that is all, thank you, Mr. Poor.

Q MR. S.B. SMITH: Mr. Poor, are you the man to tell us about the economics that I was asking Mr. Sample about?

A I do not know anything about the economics of the line at this time.

Q Thank you.

Q DR. GOVIER: Mr. Poor, would you tell me whether in your opinion the total capital expenditure contemplated for this proposed line is within the normal range for the transmission of the amount of gas involved over the distance involved? I take it that you would normally think of a certain range of capital cost figures for transmitting a certain amount of gas a certain distance.

A Well, as set up in these exhibits, I think that the capital cost per Mcf. of sales is higher than we usually expect in the United States today, but my feeling on that is that that is because of the load factor that has been used in the light of what I feel is pessimism on the part of the distributing companies in the West Coast as to the accept-

ance of natural gas.

Q My understanding was that the load factor after reasonable peak shaving, was it 76.6 per cent, or something like that?

A I believe that is correct.

Q I think that was the figure Mr. Sample gave somewhere, somewhere around there?

A Yes.

Q That is not a low load factor?

A No, it is not a low load factor, nor is it a particularly high load factor, nor is the line as set up to operate in the 5th year operating at its ultimate capacity in relation to compressor horsepower and pumpage.

Q Well, would it be fair, then, to sum up your view this way, as feeling that perhaps the capital cost per Mcf. mile is apparently high for the first or for the fifth year of operation but you feel that due to the conservativeness of some of the market estimates that very shortly the capital cost per Mcf. mile would be quite reasonable?

A That is my feeling, based on the experience of other lines of like character in the States.

Q Thank you.

MR. C.E. SMITH: May I ask one question.

Q Mr. Poor, can you give me in any general reason why distributing companies such as those for Vancouver and Seattle, why they should be conservative in their estimate with respect to future markets?

A That is a matter of philosophy, Mr. Smith. The only thing I can say is that it is inherent in manufactured gas companies, in my experience, that they, over the last

few years where they have been losing customers in the face of increasing fuel prices and owing to other fuels, they just can not believe that the acceptance of natural gas is what it is.

Q That has just "growed on" them?

A That has just growed on them, they have been beat down. That is just my opinion about it.

Q Because for a moment I would think they might be inclined to go the other way. Your suggestion is with the experience they have had it is such they can not get optimistic, is that it?

A That is my feeling.

MR. McDONALD: Sir, I can continue with Mr. Poor and put in this further exhibit with regard to routes.

PIPE LINE PROJECT TO INLAND EMPIRE, MAIN LINE SYSTEM IN CANADA, MAIN LINE SYSTEM IN UNITED STATES, PUT IN AND MARKED EXHIBIT 49.

Q This is pipe Line Project to Inland Empire, Main Line System in Canada, Main Line System in United States. I think,Mr. Poor, it is a short exhibit and if you would read it and then refer to the tables.

A "Summary of Important Features by Sections - Pipe Line Project to Inland Empire", setting forth on page 1 the important features by sections and broken down as between Main Line and Branch Lines. Items 1 and 2, pipelines in Canada, Pincher Creek main, Trail line; pipelines in the United States, and the total for 520 miles of main pipe-line, 22 miles of branch lines, for a total of 542 miles,

the total tonnage involved being 60,445. The estimated construction cost, item 5, pipelines in Canada, Pincher Creek main line, $3,104,300.00; the Trail line $411,200.00; the United States, $25,156,500.00, for a total of $28,672,000.00, with sales, duties and taxes in Canada of $145,200.00 on the Pincher Creek main line; $21,500.00 on the Trail line; for a total of $165,700.00. The total estimated cost of the project being $28,837,700.00. There follows under items 8, 9 and 10 the estimated annual volumes of gas sales, the maximum daily sales (including storage), and the maximum daily purchases.

Page 2, the "Proposed Route of Natural Gas Transmission System, Pipe Line Project to Inland Empire."

General Description of Route

Pincher Creek Field to International Boundary
(Distance 42 miles)

The Route of the proposed main transmission line from its starting point in the Pincher Creek Gas Field in Southwestern Alberta into Montana, Washington and back into British Columbia near Trail is shown on the following map entitled "Proposed Natural Gas Pipe Lines to Montana, Idaho and Eastern Washington".

The main line will originate in the Province of Alberta at a point approximately 6 miles east of the Fifth Meridian in the northwest quarter of Township 4, Range 29, west of the Fourth Meridian in the northwest end of the Pincher Creek Gas Field as it is now defined. From this point the line extends approximately due south for a

distance of some 14 miles into the north end of Waterton Lakes National Park. From the point of beginning to the Park the line is located just west of Highway No. 6. From the Park the line follows, in a westerly direction, the meanderings of a pass through the mountains to cross the Alberta-British Columbia boundary approximately 28 miles from the point of origin.

From the Alberta-British Columbia boundary the line continues in a southwesterly direction to cross the international boundary some 17 miles west of the Fifth meridian.

International Boundary to Spokane
(Distance 250 miles)

From the international boundary the route extends generally south crossing the Flathead River south of the boundary. Thence the route follows along the valley of the Flathead on the east side of the River to near latitude 48 deg 30 min. From this point the route extends west of south passing west of Columbia Falls and northwest of the town of Kalispell in Montana. From Kalispell it follows the valleys and extends in a southwesterly direction parallel to and in the vicinity of roads, highways and railroads, to pass near the towns of Kila, Marion and Yakt in Montana. From Yakt the line extends in a southerly direction through the valley of the Thompson River to pass south of the town of Thompson Falls. From Thompson Falls to Spokane the route extends approximately due west again following roads, highways, railroads and valleys, passing near the towns of Burke, Wallace, Kellogg, Kingston,

Cataldo, Coeur d'Alene and Post Falls in Idaho. Generally the route lies in rolling to hilly to rough terrain, and through good pipe line country in the valleys. Some rock will be encountered.

Montana Storage Main
(Distance 110 miles)

From a point on the 20 in. main line in the vicinity of latitude 48 deg 30 min and on the east side of the Flathead River approximately 11 miles northeast of the town of Whitefish, Montana, the storage line to Montana will extend in an easterly direction passing south of the town of Belton to follow the route of the Great Northern Railroad and Highway No. 2 to pass near the towns of Nyack, Paola, Nimrod and Glacier Park. Thence the route extends to the east approximately 3 miles of the Town of Browning, Montana, thence continuing in a northeasterly direction still in the vicinity of the Great Northern Railroad and Highway No. 2, to pass north of the town of Cut Bank in Montana, to the storage area.

Trail Line
(Distance 118 miles)

From the Spokane terminal of the large diameter main line the route of the line to Trail extends in a northwesterly direction following close to roads, highways, railroads and valleys to Rossland and Trail, British Columbia. This route passes near the towns of Deer Park, Loon Lake, Springdale, Chewelah, Addy, Colville and Onion Creek in Washington. Approximately one half of this route is in rolling to hilly rough terrain, and the remainder in

the Colville and Columbia River valleys is in easy going pipe line country. Rock will be encountered just northwest of Spokane and between the international boundary and Trail.

Length of Transmission System

The total length of the main transmission system as above described is estimated at 520 pipe line miles, subdivided as follows.

Q MR. C.E. SMITH: Did you intend to read 420?

A THE WITNESS: 520, I am sorry. In tabular form it sets forth the designation of the various lines and the length in miles in Canada and the United States, and the total balancing the total of 520 miles.

Location	Length (miles) In Canada	In United States	Total
Pincher Creek Field to International Boundary	42		42
International Boundary to Spokane,		250	250
Storage Line, Whitefish to Cut Bank Area,		110	110
Trail Line from Spokane to International Boundary,		108	108
Trail Line from Trail to International Boundary,	10		10
Total	52	468	520

Short laterals to reach markets along the main line are estimated at 20 miles in the United States and 2 miles in Canada to make a total length of 542 pipe-line miles.

W. B. Poor,
Re-Ex. by Mr. McDonald.

PIPE LINE DESIGN

Pipe Line Project to Inland Empire

The proposed pipe line system to the Inland Empire is designed to handle delivery of 25 billion cubic feet annually, leveled to 75 per cent load factor by storage from an input pressure at Pincher Creek Field of 750 psi gauge.

The attached table "Size and Length of Pipe in Transmission System" gives a summary of pipe installation.

For delivery of 100 MMcf per day from Pincher Creek Field at 750 psi inlet, the normal operating pressure at the Whitefish takeoff of the storage line is 650 psi and at Spokane it is 400 psi.

A 1,000-horsepower compressor station is provided on the 8-in. Trail line at the Spokane takeoff to boost line pressure to 925 psi for delivery of 23 MMcf per day into this line.

The storage line will deliver 80 MMcf per day to Montana at 400 psi.

SIZE AND LENGTH OF PIPE IN TRANSMISSION SYSTEM

Pipe Line Project to Inland Empire

Mile Post	Location	Main Line Size (Inches)	Main Line Length (miles)	Branch Lines Size (Inches)	Branch Lines Length (Miles)
0	Pincher Creek Intake	20 x 1/4	42		
42	International Boundary	20 x 1/4	250		
292	Spokane	8-5/8 x 1/4	108		
400	International Boundary	8-5/8 x 1/4	10		
410	Trail	-	-		
0	Storage Area	16 x 1/4	110		
110	Whitefish Connection				
	Branch Lines			4-1/2 x 0.237	22
	Total System		520		22

To save time, this is a table setting forth the various sizes and wall thicknesses of pipe in the line.

Page 8 sets forth a summary of the estimated transmission system construction cost for this project, broken down into 24 items in a similar manner as the tables already submitted, the total being the amount of $28,837,700.00.

Page 9 sets forth a break-down of the details of estimated direct cost of pipe lines and measuring stations. The break-down is between the main line in Canada, the branch lines in Canada, the main line in the United States and branch lines in the United States.

Page 10 sets forth certain details of estimated direct cost of compressor stations set out under 8 items, for a total of $244,000.00.

THE CHAIRMAN: Mr. Nolan, have you any

questions?

MR. NOLAN: Not at the moment, Mr. Chairman. As Mr. McDonald says, I will have to absorb the information as contained in this exhibit.

Q DR. GOVIER: Mr. Poor, would you care to tell us something about this mysterious storage field?

A I think there are people here far better qualified to talk about the so-called mysterious storage field than I am, but actually it is my information that it is the nearly depleted Cut Bank field or producing field near Cut Bank.

Q It did not look like the Cut Bank field the way it was drawn. Will someone else be prepared to discuss that, Mr. McDonald? The storage field and its characteristics and so on?

MR. McDONALD: Yes, sir, that information can be provided, sir. It won't be today.

MR. C.E. SMITH: Is that dealt with in your amended application, Mr. McDonald?

MR. McDONALD: The storage field?

MR. C.E. SMITH: Yes.

MR. McDONALD: I do not think the storage field was mentioned, no.

MR. C.E. SMITH: I was wondering, like Dr. Govier, where we got it here.

MR. McDONALD: It was set out in Exhibit 6, that is, Dr. Hetherington's submission, but I will have the information available for the Board.

Q DR. GOVIER: Mr. Poor, do you believe it would be proper to take into account along with the capital

cost of the line any capital cost that might be required in order to put a storage field into operation? Would you consider that a pipeline accessory?

A That would depend entirely upon the ownership of the storage field. In this particular instance, the storage field has been assumed to be leased on an Mcf. of storage utilized.

Q So it would enter as an item of transmission cost?

A That is correct.

Q On page 6, Mr. Poor, the last line, you stated the storage line will deliver 80 million cubic feet per day to Montana at 400 pounds?

A Yes.

Q Does that mean during off-peak periods the storage line would do it or that is the capacity of the storage line?

A That is the capacity of the storage line.

Q MR. GOODALL: Would you tell us just what the advantages are in taking your storage line off in the vicinity of Whitefish rather than much more direct and an easier travelled route in the vicinity of Pincher Creek?

A There is only one prime advantage to that and that is that on peak days or on the basis of diversity of utilization of lines you have two sources of supply joined at a point in the vicinity of Whitefish whereby your deliverability is greater than it would be if the gas were moved from Pincher Creek in and out of storage and thence down the line.

Q It appears it would cost a lot more to build the line the way it is, doesn't it, taking off from Whitefish, than it would be over the shorter route and more easily travelled route in the vicinity of Pincher Creek? I am just wondering

if the advantages would compensate for the greater expense?

MR. McDONALD: Mr. Goodall, if I might deal with that. The suggestion you have made has already occurred to us. There is one disadvantage and that is the obligation of storing it in the United States and bringing this gas out again and transferring it back. We chose to put in the more expensive line, which would be the 130-mile line east from the vicinity of Belton, and if the other should be adopted and the difficulties which may occur are ironed out, it may be adopted and it would be a considerable saving, mostly in capital cost, not in operating cost.

THE CHAIRMAN: Proceed with the next.

MR. S.B. SMITH: Excuse me, Mr. McDonald, I have a question or two.

Q Do you know the Glacier Pipeline Company or corporation?

A What do you mean, do I know it?

Q Do you know of them?

A I have heard of them.

Q And have they got an application before the Federal Power Commission?

A So I understand.

Q To take gas from the Westcoast Transmission?

A I do not know who they propose to take gas from, I have not seen the application.

Q You have heard that?

A No, I can not say I have heard it.

Q You do not know where they are going to get the gas?

A I do not know.

Q Where are they going to sell the gas?

A I have no idea.

Q And you have no information with regard to where this gas is going to be sold which it is proposed to take?

A I have no market information.

Q You do not deal with that?

A No, sir.

THE CHAIRMAN: I think we might adjourn for about 10 minutes.

(The Hearing then took a short adjournment.)

(Go to page 1579)

C. R. HETHERINGTON (recalled)

THE CHAIRMAN: Gentlemen, there was an error made in marking the exhibits this morning. The exhibit that we marked as Exhibit 47 should be Exhibit 48. That is the document entitled "Estimate of Market for Proposed Sales Lateral from Main Gathering System to Grande Prairie." That should be Exhibit 48. And the exhibit which was marked Exhibit 48 this morning will now become Exhibit 49. That is the document "Pipe Line Project Inland Empire, Main Line System in Canada, Main Line Systemin United States".

MR.McDONALD: Sir, the next exhibit that Dr. Hetherington will deal with is the document entitled "Deliverability of Peace River Gas to Provide Pipe Line Requirements."

THE CHAIRMAN: That will be Number 50.

WESTCOAST TRANSMISSION COMPANY DOCUMENT ENTITLED "DELIVERABILITY OF PEACE RIVER GAS TO PROVIDE PIPE LINE REQUIREMENTS"MARKED EXHIBIT 50.

MR. C. E. SMITH: That has been numbered 50 now, has it, sir?

THE CHAIRMAN: Yes.

Q MR. McDONALD: Dr. Hetherington, will you deal with the exhibit itself?

A This exhibit is prepared on the same basis as the previous exhibits of mine in connection with deliverability of Alberta gas fields, and so it has not included the details behind the development on the deliverability charts, but simply gives them with the result. It is entitled "Deliverability of Peace River Gas to Provide Pipe Line Requirements".

C. R. Hetherington,
Dir. Ex. by Mr. McDonald

The attached Chart No. 1 gives the total estimated deliverability from the fields listed below in the Peace River area for various total quantities of gas withdrawn from the area. Following then is a list of gas fields with the recoverable gas as estimated by Dr. Nauss and as modified by developments since that time. I believe the only change from Dr. Nauss, from the testimony of Dr. Nauss, is in connection with the recoverable gas reserve of the Spirit River Gething horizon. That change results from a recent pressure test and back pressure flow test on the Spirit River well, which showed that the bottom hole pressure was 1520 pounds per square inch absolute, which is considerably higher than the estimated figure used by Dr. Nauss in his estimates, and the estimate has just been re-calculated using the higher bottom hole pressure. Otherwise, the figures are the same as given by him. The Little Smoky Lake and Valleyview fields are indicated with recoverable reserves but they are not included as connected to the gathering system in this chart No. 1 of the total deliverability.

Field		Recoverable Gas MMMCF
Whitelaw	-Gething	17.0
	-Triassic	320.0
Tangent	-Cadotte	67.7
	-Gething	120.0
	-Triassic	100.8
Belloy		72.0
Spirit River	-Cadotte	36.9
	-Gething	207.9
Normandville		25.8
Pouce Coupe		118.0**
Sunrise		21.5
Little Smoky Lake *		5.8
Valleyview *		13.5
Total		1,126.9

Note: (*) Presently beyond economic reach and not considered in deliverability calculations.
(**) Does not include 20 MMMcf of recoverable gas reserved for local use.

Chart No. 1 is based on the attached well deliverability and withdrawal characteristic charts for dry gas horizons. Example calculations for the total deliverability from the area are given in the attached Table No. 2.

This Table No. 2 just gives the calculation of the deliverability remaining at 25% of the calculated open flow after 300 billion cubic feet of dry gas has been withdrawn, after 500 billion cubic feet has been withdrawn, and after 750 billion cubic feet has been withdrawn. The maximum number of wells based on 640-acre spacing is assumed in each of those calculations. An allowance is made in the Pouce Coupe field for the reserves of 25 billion cubic feet of gas in place or 20 billion cubic feet of dry gas for the use of the Town of Dawson Creek.

From similar calculations as given in Table 2, the curve in Chart No. 1 showing the total deliverability of gas from the Peace River area was computed.

Table No. 1 herein gives the requirements for natural gas by years for the project of Westcoast Transmission Company Limited developed to various capacities as follows: In the first year, 24.6 billion cubic feet, 101.6 million cubic feet per day, maximum day. The second year 39.billion cubic feet, or 143.4 million cubic feet per day. The third year, 49 billion cubic feet or 194.1 million cubic feet per day. The fourth year 60.5 billion cubic

feet or 210.1 million cubic feet per day. The fifth year 66.2 billion cubic feet, with a maximum day of 239.2 million cubic feet.

Annual and Maximum-Day Requirements

Developed Capacity Developed Capacity	Annual MMMcf	Maximum Day MMcf
First Year	24.6	101.6
Second Year	39.0	143.4
Third Year	49.0	194.1
Fourth Year	60.5	210.1
Fifth Year	66.2	239.2

Referring to Chart No. 1 the project developed to first-year capacity of 101.6 MMcf per day can be supplied with deliverable gas until 910 MMMcf has been withdrawn from the area. Referring to Table No. 1 the project developed to first-year capacity will not consume 910 MMMcf of gas during the first 30 years of operation. A solid line is drawn on Table No. 1 after the 30th year in the column for first-year capacity to indicate that first-year capacity is deliverable in excess of 30 years.

The project developed to second-year capacity of 143.4 Mmcf per day can be supplied with deliverable gas until 780 MMMcf has been withdrawn.Referring to Table No. 1, 780 MMMcf will be consumed at the rate of second-year capacity between the 20th and 21st years.

The solid line in Table No. 1 shows the number of years that full deliverability can be met for the project developed to first to fifth year capacity.

In summary, the deliverability of gas in the Peace River area is sufficient to support pipe line capacity for the following number of years: This Table gives three headings, capacity in terms of the year's operations, and the number of years that the capacity can be supported

by recoverable gas in the ground, in the second column, and the number of years that capacity can be supported by full deliverability in the third column. For the first year there is 30 years plus in the ground, and 30 years plus deliverability; for the second year's capacity there is 29 years' supply of gas in the ground, and 20 years' deliverability; for the third year capacity there is 24 years' gas in the ground and 14 years' deliverability; for the fourth year there is 20 years' gas in the ground and 12 years' deliverability; and for the fifth year capacity, there is 18 years' in the ground and 10 years' of full deliverability.

	Number of Years	
Capacity	Recoverable Gas in Ground	Full Deliverability
First Year	30 plus	30 plus
Second Year	29	20
Third Year	24	14
Fourth Year	20	12
Fifth Year	18	10

Table No. 3 summarizes deliverability data used in preparation of these estimates.

This Table 3 is similar to other Tables presented in similar deliverability schedules by Westcoast, and the following charts for each of the Peace River gas fields are based on the data given in Table No. 3 and computed as described previously in these Hearings. No chart is included for the Normandville field, and in the deliverability calculations it is assumed that a nominal amount of gas will be obtained from that field, both in the form of dry gas and in the form of casinghead gas.

Q Thank you, Dr. Hetherington.

.....

CROSS-EXAMINATION BY MR.NOLAN:

Q Dr. Hetherington, on page 2 of your exhibit which has been marked as Exhibit 50, I see that the maximum day requirement in the fifth year is given by you at the figure of 239.2?

A Yes.

Q Tell me, how do you reconcile that with the figure that we have on the gathering system flow diagram, Exhibit 44, where you have a figure of 237.8?

A Well, that maximum day is the capacity from Mr. Sample's market estimate. Wait a minute, I will make a correction there, The figures shown on the. . .

Q It has not got a page number, it is the gathering system flow diagram?

A Well, I think the total would be 239.8, Mr. Nolan.

Q There is a mistake in the figure, is there?

A Well, there is no mistake in the figure, it is just - the difference comes about by virtue of the small amount of gas in the Sunrise gas field which this deliverability schedule does not include, or, rather, this deliverability schedule does include the Sunrise gas field, which is in British Columbia, and is not shown on the full diagram.

Q I see?

A So that a subtraction would have to be made from that to get the figures to balance out.

Q And that accounts for that difference?

A Yes.

Q Thank you.

.....

CROSS-EXAMINATION BY MR. BREDIN:

Q Dr. Hetherington, in your earlier submission you mentioned something about the Turner Valley storage project. I do not know whether it is fair to refer to your Exhibit 49, but I see nothing of a pipe line connecting the Pincher Creek field with the storage project in Turner Valley. Is that an omission?

A Well, that was brought out at the time, I think, that any storage done in Turner Valley was assumed by us to be done by the Gas Company, as with any connecting lines, and it was just our suggestion that the storage could be used to assist the Gas Company in meeting their loads.

Q Can you give me the average daily take from the Pincher Creek field? What do you intend to take daily from the Pincher Creek field?

A That is in Exhibit 6. Actually it is in Exhibit 5, and the plan as originally proposed in Exhibit No. 5 contemplated taking about 50.8 million cubic feet per day on the peak day initially, eventually getting up to 125 million cubic feet per day.

Q I do not know whether this question should be directed to you, but I notice that the pipe line project in Exhibit 49 passes reasonably close to Missoula, Montana. Is it the intention of your company, or a subsidiary, or an affiliate, to serve Missoula?

A I think certainly Missoula would be connected up. It is not the plan that is shown in this exhibit, but I think that in the second stage of any construction program certainly Missoula would be connected up to this system, and I understand it is the plan of the Montana Power Company to serve Missoula, so

that there would be an inter-connection there.

Q That is all I have, thank you.

THE CHAIRMAN: Have you anything else you wish to present, Mr. McDonald?

MR. McDONALD: No, I haven't anything else, sir.

Q DR. GOVIER: Dr. Hetherington, I wonder if you would look at Table 3? Am I right in assuming that the figure shown in Column 2, that the figures shown in Column 2 are the acreages that Dr. Nauss submitted in his previous testimony?

A Yes.

Q And in the case of the Tangent field, as I recall it, the 22,000 acreage figure that is shown for the Gadotte and Gething sands, that is also the figure that the Hudson's Bay Oil & Gas Company submitted.

MR. McDONALD: Dr. Govier, I think I should deal with that. Upon receiving the results of the well from which the Hudson's Bay Company changed their estimate, I instructed Dr. Hetherington that the acreage should be increased, but I did not care to go to the 22,000 acres, so he used 14,000 acres, and then we found that on Monday Mr. Brown indicated that the Hudson's Bay Company felt that the 22,000 acres was the reserve area, so that to that extent this submission is subject to revision.

DR. GOVIER: That is what I was getting at, Mr. McDonald.

MR. McDONALD: Yes.

DR. GOVIER: It will be your intention then, to alter the figure of 14,000 for the Triassic?

MR. McDONALD: Yes.

DR. GOVIER: Up to the 22,000?

MR.McDONALD: Yes.

DR. GOVIER: In line with Mr. Brown's figure?

MR. McDONALD: Yes.

A Dr. Govier, we had to call a halt in making changes in this thing at some time, and Mr. McDonald has some changes he would like me to make, and maybe by November 13th I will feel free to revise this, because it seems that upward revisions are in order.

Q DR. GOVIER: In any case, those would be upward revisions?

A Yes. And when I said the only change I made to Dr. Nauss's figure was the Spirit River Gething in regard to the pressure, I should also say I did change his figure at Tangent in respect to the Triassic. He had a smaller figure in his estimate.

Q Can you tell me, Dr. Hetherington, how you arrive at the figures in Column 8, the average daily open flow? If you could just make a brief statement indicating where you had that pressure test and where you did not, and so on?

A Well, in - I am calling on my memory here, but in the case of Whitelaw, the figures came from the interpretation of drill stem tests by Dr. Nauss and myself. Similarly, in Tangent and Belloy. Now, in the case of Spirit River, in the Cadotte, that is also a drill stem test interpretation, and when you came to the Gething, we estimated that on the basis of drill stem tests that that well ought to produce conservatively 16 million cubic feet per day open flow.

A Then a test was run after cleaning the well out and it was found that instead of 16 that it stabilized at 66 million cubic feet per day. I just offer that figure as an indication that we have taken the drill stem tests and roughly multiplied them by between 2½ and 4 depending on the situation. Now, the drill stem tests of Spirit River and the Gething, multiplied by, I forget what it was, 2½ to 4, the answer was 16. Upon actually running the test it turned out the open flow was 66 million cubic feet a day. At Normandville, that is the dry gas estimate of the open flow of 6 million based on drill stem tests. There were drill stem tests and back-pressure tests at Sunrise. At Pouce Coupe their back-pressure tests are a pretty good check there. Valleyview and Little Smokey are based on drill stem tests.

Q Does that mean, Dr. Hetherington, that whatever error there might be in your estimation of the open flow from drill stem tests would carry through to the final result?

A Yes, that is right, and for that reason they were estimated on the basis of drill stem tests alone. We tried to use conservative figures that gave a reasonable answer.

Q Are you yourself quite confident that in the over-all and on the average there would be no disappointment in expecting the open flow as you have chosen?

A I believe they are, for this reason. Looking down on those columns of open flows they are in the order of 10 million, 6 million. A 10 million cubic foot well, say, 2500 or 3,000 feet deep is not a big well. You look at the wells that have been tested, Pouce Coupe and Spirit River,

Gething, and in those cases where tests have been made the actual open flow is considerably greater than any of the open flows that we estimated just from the drill stem tests, so I feel that in the over-all the open flows and deliverabilities that can be obtained from those fields will be at least as large as I have indicated here.

Q Is it your opinion, Dr. Hetherington, that the Federal Power Commission would be satisfied with deliverability studies based upon such estimates?

A No. I think they would want some back pressure data at some time in the process.

Q Have you any idea why back-pressure tests were not conducted on these wells?

A I think the biggest reason is there is no present market for the gas and it costs money to run those tests. They were drilled as oil wells, they were not cleaned up as gas wells. Before an open flow would mean anything as far as I am concerned I would want the well certainly cleaned out, and if it had a history of being drilled through without proper mud protection to a deeper formation in the search for oil I would even then question the result of the open flow tests. I think the thing to bear in mind here is that these are primarily oil wells that got gas and there was no intent to test them for gas. The Pacific wells now where they were looking for gas, looking for gas, at least, secondarily, were all tested.

Q I suppose many of the wells have not been perforated, would that be right?

A I think that is right, yes.

Q Would you look at column 10, Dr. Hetherington. I notice you have used a 5 per cent deduction throughout. Is that in your opinion completely adequate?

A In the case of dry, sweet gas of this type I believe it is. Now, this 95 per cent is the above-ground shrinkage. They comprise all Dr. Nauss's over-all shrinkage factor of, I believe, 80 per cent, as what he used in these fields. As a matter of fact, I can not figure out where 5 per cent of the gas is going to be used. The amount for dehydration is small, the amount for blowing is small, line loss amounts to nothing, and I think 5 per cent is adequate.

Q Would you look at table 2, please, Doctor. Again in discussing this table you mentioned that the number of wells were based on 640-acre spacing?

A Yes.

Q And I take it on the area shown in table 2, I mean, column 2 of table 3?

A That is right, that is the intention.

Q And that represents the maximum number of wells?

A The maximum number, yes.

Q Now, is column 2 of table 2 the same maximum number of wells, or is it the number of wells you start out with?

A No, that would be the maximum number of wells in each case.

Q And have you assumed that number of wells for the three withdrawal cases which you have analyzed here?

A Yes. That gives the result of obtaining a maximum deliverability then for each of those withdrawals. Chart 1 is based on that premise.

Q Referring to your conclusion on page 3, Dr. Hetherington,

on the assumption that the deliverability analysis had been based on completely adequate data, would it be your opinion that the Federal Power Commission would be satisfied with the recoverable gas and the deliverability suggested by this summary tabulation?

A I think that that would be satisfied to the extent of initial capacity, possibly second or third year capacity.

Q I gather you do not think they would be satisfied with respect to fourth or fifth year capacity, is that the point?

A Well, we are speaking about a particular situation where there are no other gas companies here. In proven gas reserves, a large amount available for connection to a pipeline other than those already discussed, I believe that they would undoubtedly consider the possibility of finding additional gas in that area, but I do not believe that just based on the information that we have here they would outright grant the full fifth year capacity. As a matter of fact, there is no need to do that because the pipeline is built in stages anyway and certainly it takes a year to go from one stage to the other, so that there is plenty of time to come back and ask for additional gas when that gas becomes available. I believe there is a sufficient showing of gas to warrant the project and to warrant its authorization to, say, second or third year capacity at this time.

Q Do you believe the project could be financed on the basis of the recoverable gas and the deliverability shown here?

A I believe it could, yes.

Q Thanks, Dr. Hetherington.

MR. NOLAN: I wonder if I could just ask Dr. Hetherington one more question, if I may, please.

Q Doctor, in your table 3 under your heading column 4 you show certain formation pressures in pounds per square inch absolute, and on line 3 I notice that under "Tangent" in the Cadotte horizon you show a formation pressure of 425?

A Yes.

Q Now, the line pressure, as I understand it, from the gathering system flow diagram that we were looking at a few minutes ago, is 582.

A Yes.

Q Well, can you withdraw the gas from that formation with the formation pressure of 425 and a line pressure of 582?

A No. For the periods of the initial years in that gathering system no gas is taken from the Cadotte for the five year period shown on that flow diagram. In other words, that gas would be used after the Gething and Triassic gets down to that pressure, at which time a compressor station would be required to boost the gas into the gathering lines.

Q There is no difficulty about the Gething or the Triassic because the pressures are such as to enable the removal from those horizons?

A That is substantially correct. I mean, the thing has to be balanced up. I would like a little higher pressure if I could have it.

Q Line 7 in the Spirit River you have a formation pressure there of 617 and a line pressure of 696. That means to say no gas must be taken out of that horizon?

A I believe that is right. I believe throughout in that

fifth year flow diagram we do not consider the Cadotte as being productive at that time.

Q That would mean that those 22,000 acres in the Cadotte in one instance and the 10,000 acres in the Cadotte in the second instance would not be productive for that period?

A That is right, yes. They could be productive if they were needed but it would involve a compressor station.

Q Yes, quite so.

Q DR. GOVIER: Dr. Hetherington, there is one other question I want to ask, I am sorry. Looking again at table 3, I am sorry, at page 3, if the pipeline project were to be considered and, say, put into operation in the early part of 1954, just as an assumption, it would operate for the first year at the first year capacity, for the second year at the second year capacity, and so on, is that right?

A Well, assuming it could be expected that the gas would be available, yes, it would.

Q So that would really mean that the full capacity of the pipeline when you take into account the question of building up of load, would be satisfied for a greater period of years than shown by this little tabulation. What is confusing me is that if you look at the last line, for example, it suggests that on the basis of fifth year capacity you have only 10 years deliverability, but the only practical way of getting to fifth year capacity is to go through the first year, the second year, the third year, and fourth year and so on.

A That is reflected in here already, Dr. Govier. If you

notice on table 1 the first year capacity is 24.6 billion,

Q Yes?

A And the next year's capacity is the difference between 63.6 and 24.6, which is 39 billion.

Q Oh, yes.

A So I have already taken that into consideration.

Q Those are increments in capacity?

A That is right, yes.

Q MR. S.B. SMITH: Dr. Hetherington, you were talking about getting a certificate from the Federal Power Commission and financing this undertaking, and I think you said that you thought you could get Federal Power's approval on the basis of the second year capacity or the third year capacity, one or the other?

A Yes.

Q Not averaging those, you are saying the possibility might be one or the other?

A Yes.

Q And you thought also that this undertaking could be financed. Now, do I take your answers to mean in relation to the certificate of the Federal Power Commission and your financing of the project that you are speaking only of deliverability and reserves and not of the economic aspects of the matter?

A That is right.

Q Yes. You are not taking into account the economics at all, are you?

A No, not in this exhibit.

Q In your answers you made a few minutes ago?

A Well, Mr. Smith, this Hearing has been recessed here to the 13th and we will all find out about the economics at that time.

Q I am asking you what you meant today?

A Today I am talking specifically about deliverability and my answers to Dr. Govier were in connection with the gas reserves and deliverability.

Q Gas reserves and deliverability and nothing more?

A Yes.

Q Yes, thank you.

MR. McDONALD: That is all I have, sir. It just occurs to me, sir, that with regard to Exhibit 44 it may be that instead of having Dr. Hetherington and Mr. Poor back on the 13th of November, one or the other or only one of them may be available, but I do believe either one can deal with these exhibits that have been filed today unless counsel expressly wish one or other of them to return, and I would only ask one of them to come back, that is, to deal with specific questions. Otherwise, I feel on general questions either one of the engineers can deal with the submission.

THE CHAIRMAN: That will be satisfactory to the Board. We will adjourn then until November 13th at 9:30 A.M.

(The Hearing then adjourned until Tuesday, November 13th, 1951, at 9:30 A.M.)

The Province of Alberta

PETROLEUM AND NATURAL GAS CONSERVATION BOARD

IN THE MATTER OF THE GAS RESOURCES PRESERVATION ACT

AND IN THE MATTER OF the application of Westcoast Transmission Company Limited and Westcoast Transmission Company Ltd. (Alberta Incorporation) for a permit authorizing the purchase and sale of Natural Gas in the Province of Alberta for transmission to points in the Province of British Columbia and the States of Washington and Oregon in the United States of America.

I. N. McKinnon Esq., Chairman

D. P. Goodall Esq.

Dr. G. W. Govier

Session:

Volume_____